IJPD The Indonesian Journal of Planning and Development
P-ISSN: 2087-9733 E-ISSN: 2442-983X
Journal Homepage: http://ejournal2.undip.ac.id/index.php/ijpd
Volume 11 No 1, February 2026, 27-36
https://doi.org/10.14710/ijpd.11.1.27-36
OPEN ACCESS

The Experience of Commuters Facing Severe Traffic Congestion in The Jabodetabek Area

Submitted: 19 May 2025
Accepted: 26 February 2026
Available Online: 28 February 2026

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Abstract

Congestion that occurs in the Greater Jakarta metropolitan area is the result of an imbalance between road capacity and the number of vehicles crossing an area. According to data from the 2023 commuter survey, 79% of private vehicle users and 19.5% of public transportation users, the rest are non-motorized vehicle users. Congestion that occurs is not only due to an imbalance in road capacity and the use of motor vehicles, there are factors that affect severe congestion in Greater Jakarta, namely individual characteristic variables (gender, age, education, occupation, and income), mode of transportation (mode of transportation used and frequency of change of modes) and travel characteristics (distance traveled and travel time). Variables of distance traveled and travel time are important factors for severe congestion in Greater Jakarta. This study aims to analyze the influence and significance of each variable on the chances of severe congestion experienced by commuters in the Greater Jakarta area. This data was analyzed statistically descriptive and inferential. This study utilizes microdata from the 2023 Jabodetabek Commuter Survey from the Central Statistics Agency. The results of the analysis show that all the variables proposed in this study have a significant effect on the chance of severe congestion.

Keywords: *Binary Logistic Regression, Commuters, Severe Congestion*

1. Introduction

Major cities in Indonesia are increasingly developing into economic centers characterized by the availability of social and economic facilities and facilities that attract residents to come. The increasing development of urban areas has caused the city center to experience a change in land use from residential areas to office areas. Meanwhile, suburban areas have undergone a change in land function that was originally agricultural land into residential and industrial land (Firman, 1996). The process of urban development to suburban areas is found in the areas of Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek). Jakarta, which is the center of population concentration and all activities, is constantly experiencing growth and development both physically, socially, and economically. However, Jakarta is unable to accommodate population growth, causing the migration of residents from Jakarta to the suburbs, namely the Bogor, Depok, Tangerang, and Bekasi areas (Warsida et all, 2013).

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How to Cite:
Hasanah, L. U., & Chotib, C. (2026). The Experience of Commuters Facing Severe Traffic Congestion in The Jabodetabek Area. *The Indonesian Journal of Planning and Development, 11*(1), 27-36. https://doi.org/10.14710/ijpd.11.1.27-36

Fast-growing cities are urban sprawl, which encourages extensive land ownership and is usually accompanied by serious problems including inefficient land use and high reliance on private vehicles. The movement of people to the suburbs and the fact that their lives are still dependent on the city center leads to mobility from the suburbs to the city center. The decision and determination to keep the home of the home area (in the suburbs) but work in the destination area (in the city center) creates a commuting flow. The significant difference between villages and cities requires adjusting the labor market to labor growth. The reality that still occurs is that there are inequality and differences in job opportunities between regions. This difference encourages commuting, where most workers in metropolitan areas contain commuters. The definition of commuting mobility is the movement that occurs when people go to work and return home on the same day (commuting). They do activities in the city during the day and at night reunite with their families in their home areas. Workers who do this shuttle mobility are referred to as commuter workers (Buchoud, 2020) (Saefullah, 1996) (Renkow, 2003) (Mantra, 1989).

Transportation problems often arise during the rapid development of a region, both in the infrastructure sector, the availability of facilities and infrastructure, and the behavior of the community. Transportation problems in urban areas are usually caused by the volume of vehicles on urban streets. This is shown by the increase in the number of vehicles by 3 percent every year, while the increase in road width is very small, less than 1 percent per year. This condition eventually makes the number of vehicles unbalanced with road capacity and causes congestion points in urban areas. DKI Jakarta has quite complex transportation problems. The current transportation problem lies in traffic density which is still difficult to overcome. The length of the road in Jakarta is only about 7 percent of the area of the city of Jakarta. Meanwhile, when referring to big cities in developed countries, the ideal road length is 12-15 percent of the city area (Mu'allimah, 2021).

The definition of congestion according to is a condition where the traffic flow on a road section exceeds the planned capacity, so that the speed of the vehicle is close to 0 km/h and causes long queues. In other words, congestion occurs when the volume of traffic passing on a road section is greater than the number of vehicles that can be accommodated by the road. Based on the Tomtom Index in 2024, Jakarta ranks 25th in the world with 108 hours lost per year during peak hours and the average travel time per 10 km is 25 minutes and 31 seconds, and has a congestion level of 43%, which means that drivers take 43% longer to cover a certain distance than when the road is free. The congestion that occurs in Jakarta according to public perception is due to the accumulation of two/four-wheeled private vehicles on many roads. This is based on the fact that the public thinks that the use of public transportation takes a long time and is inefficient, uncomfortable and the majority of public transportation is not well maintained (Direktorat Jenderal Bina Marga, 1997) (Haryono, Darunanto, & Wahyuni, 2018).

According to the study, around 14.9 percent of the commuter population out of 29.6 million Greater Jakarta residents aged 5 years and older commuted using private vehicles to go to places of activity as much as 79.0 percent. Meanwhile, as many as 19.5 percent of commuters use public transportation to go to the place of activity. During their time as commuters, 67.3 percent of commuters have experienced severe congestion. Cities that meet the indicators of intra- and inter-city connectivity need to have a public transportation share mode of more than 50%. But public transportation users in Greater Jakarta are 19.5%. South Jakarta Administrative City is recorded as the primary destination for commuters, with 882,332 arrivals from outside the area. Meanwhile, Bogor Regency is the largest point of origin, with 584,041 commuters, the majority of whom are employed, while others are pursuing education or attending training courses (BPS, 2023).

Previous research has discussed the factors that cause congestion in DKI Jakarta so that it can be determined what transportation system policies are most relevant to be implemented in DKI Jakarta. The factors that most affect congestion according to the perception of road users are the use of private vehicles is very high, the use of two-wheeled motorcycles is very high and the volume of vehicles is not proportional to the capacity of the road. Several alternative solutions are possible in terms of transportation needs, transportation infrastructure and traffic engineering and management. The research conducted by discusses the factors that cause congestion, namely facilities and infrastructure, vehicle regulation, vehicle speed regulation, road user behavior, and traffic regulation. The dominant factor that results in congestion is the behavior of road users. According to the congestion that occurs in the city of Surabaya, it is caused by the increasing number or increase in the volume of vehicles every year which is not balanced with the road quality. To obtain these results, the researcher used a qualitative method that describes objects with interview data collection techniques to drivers and users of public and private transportation. There are similarities in the variables characteristic of the respondents, namely gender, age, and occupation (Sitanggang & Saribanon, 2018) (Apriyono & Paskalis, 2021) (Rozari & Hari, 2015).

The research was conducted by in choosing the use of public transportation, people chose based on income, travel time and distance traveled. Although the results of the significant influencing factor are income only, this study uses the significance test approach method to see whether independent variables have a significant effect on dependent variables. According to determining the characteristics of the selection of transportation modes, the variables used are the characteristics of transportation users (gender, age, origin of faculty, driver's license selection, vehicle ownership, income), movement character variables (location of origin of residence, destination of movement), variables of transportation mode facilities (comfort, safety, reliability, regularity, travel time, transportation costs, distance traveled and intensity of mode change). The data analysis method used was descriptive analysis, correlation analysis between variables with the help of SPSS 16.0 software and conducting model analysis of transportation mode selection using socioeconomic data and stated preference data. The data was obtained from the results of a survey in the field (192 students as respondents) in a semantic scale and then transformed into a numerical scale using a binary logit model. Factors that affect

the choice of mode are several aspects that influence a person to use a certain mode of transportation (Prianto, Fahmi, & Permatasari, 2020) (Wahyu & Ernawati, 2013).

Factors that can affect the selection of transportation modes are grouped into three, namely based on road user characteristics (vehicle ownership, household structure, income), movement characteristics (purpose of traveling for work, school, shopping, etc.), and characteristics of transportation mode facilities (travel time, transportation costs, parking availability, comfort, security, reliability and regularity) (Tamin, 2000).

These findings indicate that severe congestion is not merely a matter of inadequate roadway capacity; suboptimal connectivity and intermodal integration also exacerbate conditions. Commuter trip chains that require repeated transfers, unsynchronized intermodal timetables, the absence of integrated fare/transfer schemes, and constrained last-mile segments collectively raise the generalized cost of travel (time, monetary expense, and discomfort). As a result, many commuters continue to rely on private vehicles, increasing traffic loads across Greater Jakarta and elevating the likelihood of severe congestion. Accordingly, mitigation strategies should prioritize service integration timetable synchronization, consolidation of trunk–feeder networks, bus priority lanes, park-and-ride facilities, and integrated fares in parallel with physical road capacity enhancements.

This study is undertaken to examine the relationships between individual factors (sex, age, education, occupation, income), transport mode characteristics (primary mode and frequency of transfers), and trip attributes (travel distance and travel time) and the incidence of severe congestion. Using both descriptive and inferential analyses of the 2023 Greater Jakarta Commuter Survey microdata, the study estimates the effects and statistical significance of each variable on commuters' likelihood of experiencing severe congestion in the Jabodetabek metropolitan area. The findings are expected to inform transport planning in Jabodetabek particularly efforts to increase public transport usage and to strengthen intermodal integration and connectivity to mitigate current levels of severe congestion.

2. Research Method

This study uses data from the 2023 Greater Jakarta Metropolitan Area Commuter Survey which includes a target sample of 19,050 households in 1,905 Census Blocks spread across South Jakarta City, East Jakarta City, Central Jakarta City, West Jakarta City, North Jakarta City, Bogor Regency, Bekasi Regency, Bogor City, Bekasi City, Depok City, Tangerang Regency, Tangerang City, Tangerang City, South Tangerang City. The data includes 98 variables with place descriptions (block I), household member descriptions (block IV), household descriptions (block V), general commuter descriptions (block VI), commuter travel descriptions (block VII) (BPS, 2023).

The variables used in this study are related to questions on general commuter information (block IV), general commuter information (block VI), commuter travel information (block VII), as explained in Table 1.

Table 1. Operational Definition of Variables Used in Research

No.	Variable	Name of Variable	Operational Definition	Category Conversions	Question Codes on Questionnaires
1	Variable Y	Severe congestion opportunities	Had a bad experience (severe traffic jam) on the way	If yes y=1, If not y=0	721a
2	Individual Characteristics	JK	Respondent's gender	L=1 P=0	404
		kel_umur	Age grouping	1=5-14 2=15-64 3=65 and above	406
3		educ	Last completed education	1=<SMP2=SMA/MA/equivalent 3=>Diploma 1	408
4		Stapek	Main work done	0=not working1=self-employed 2=employee3=freelancer	613
5		Income	Earnings generated in the last 1 month	in rupiah	617
6	Modes of Transportation	Mode	The main mode of transportation used to the main event venue	Not using a vehicle=0 private vehicles=1 public transportation=2	706c
7		freq_mode	How many times to use the mode of transportation to get to the main activity place	single mode=0 multi mode=1	705
8	Travel Characteristics	distance	Distance from residence to main activity venue	in kilometers	701
9		time	Long journey from residence to main activity	in minutes	702c

Source: Hasanah, 2025

In accordance with the purpose of the study, which is to analyze the variables that affect severe congestion in Greater Jakarta is regulated in such a way that the availability of data and the nature of the variables included in the research model are regulated. The operational definition of each variable is described in Table 1.

The first variable as a research subject was having had a bad experience (severe congestion) on the way. taken from questionnaire number 721a. The next variable is the mode of transportation used, the frequency of changing modes, the distance traveled and the travel time from the place of residence to the main place of activity that affects severe congestion in Greater Jakarta. Next are variables related to the characteristic attributes of individual commuters, namely the respondent's gender, age group, the last education completed, the work done and the income generated in the last 1 month.

The analysis used in this study is descriptive and inferential. Descriptive analysis was performed by bivariate cross-tabulation between each independent variable, especially the categorical type, and the dependent variable (percentage of severe congestion). Inferential analysis uses a binary logistic regression model, which is a multivariate regression analysis, in which dependent variables consist of two categories: severely congested (Y=1), and not severely congested (Y=0). With the general function of the probability of occurrence Y=1 is as follows:

$$f\ (z) = \frac{e^z}{1+ e^z} \quad (1)$$

From Equation (1), the logistic regression model is obtained:

$$\pi(X) = \frac{exp^{(\beta_0+\beta_1 x_1+\ldots\beta_p x_p)}}{1+exp^{(\beta_0+\beta_1 x_1+\ldots\beta_p x_p)}} \quad (2)$$

Explanation:

$\pi(X)$	:	the probability of occurrence for certain values of the independent variables x_1, x_2, x_p;
β_0	:	intercept the basic log-odds value (all variables=0);
$\beta_1, \beta_2, \beta_p$	:	the regression coefficient of each 1st to P variable;
$x_1, \ldots, x_p$	:	independent variables from 1st to p used to predict;$\pi(X)$
exp	:	exponential function.

Where $\pi(X)$- the probability of occurrence Y=1 and p the number of predictor variables. Logistics transformation model from Equation (2) in the form of:

$$g\ (X) = ln\left(\frac{y=1}{y=0}\right) = \beta_0 + \beta_1 * \chi_1 + \beta_2 * \chi_2 + \cdots \beta_p * \chi_p \quad (3)$$

Explanation:

$g(X)$	:	a function named "g" that takes input from a variable;(X)
β_0	:	intercept the basic log-odds value (all variables=0);
$ln\left(\frac{y=1}{y=0}\right)$	:	the natural logarithm of the probability ratio of occurrence (y=1) yes and (y=0) no;
β_0	:	intercept or regression constant;
$\beta_1, \beta_2, \beta_p$	:	the regression coefficient of each 1st to P variable;
x_1, x_2, x_p	:	The independent variables from 1st to P are used to predict.$g(X)$

The specific models developed in this study are as follows:

$g(X) = ln\left(\frac{y=1}{y=0}\right) = \beta_0 + \beta_1 * JK + \beta_2 * kel\ umur + \beta_3 * educ + \beta_4 * stapek + \beta_5 * income + \beta_6 * moda + \beta_7 * freq\ mode + \beta_8 * jarak + \beta_9 * waktu$

(4)

Explanation:

$g(X)$	:	a function named "g" that takes input from a variable (X);
β_0	:	intercept the basic log-odds value (all variables=0);
$\beta_1, \beta_2, \ldots, \beta_{14}$	:	regression coefficients of each 1st to 14th variable;
JK	:	0 = female (ref. cat.) 1 = male
$kel\ umur$	:	1 = age group 5-14 years 2 = age group 15-64 years old 3 = age group 65 and above
$educ$	:	1 = last education <SMP2 = last education of high school/MA/equivalent 3=>Diploma 1
$stapek$	:	0 = not working (ref. cat.)1 = self-effort 2 = officer3 = freelancer
$income$	:	dummy of income variables;

$moda$	:	0 = not using a vehicle (ref. cat.) 1 = private vehicle 2 = public transportation
$freq\ mode$	:	0 = single mode (ref. cat.) 1 = multimode
$jarak$	:	dummy of the variable distance traveled from residence to place of main activity;
$waktu$	:	Dummy of the variable travel time from residence to place of activity main.

The hypothesis test of independent variables, both thoroughly and partially on dependent variables, is through this binary logistics regression model is carried out using SPSS software version 29.0.2.0 (20).

3. Results and Discussions

a. Descriptive Analysis

According to the results of the analysis, the proportion of severe congestion experienced by passengers in the Greater Jakarta metropolitan area reached 67.3%. If analyzed with descriptive statistics through cross-tabulation with independent variables, there is variation in the proportion of severe congestion events. This cross-tabulation explains the difference in the proportion of severe congestion experienced by respondents by category group for each independent variable.

The first independent variable proposed in the study model is the characteristics of the trip, both the distance traveled from the place of residence to the place of main activity and the length of travel from the place of residence to the place of main activity.

Table 2. Percentage of commuters experiencing severe congestion against Categories of Independent Variables

Variable	Variable Name	Categories of Variables	Percentage of commuters experiencing congestion		Total Estimated Population	
			Not	Yes	Sum	%
Individual Characteristics	Severe congestion opportunities	Yes=1	62,5%	37,5%	3708983	100%
	Gender	No=0 L=1	58%	42%	1442951	100%
		P=0	69,50%	30,50%	2266032	100%
	Age	1=5-14,	89,50%	10,50%	883907	100%
		2=15-64	54%	46,40%	2769715	100%
		3=65 and above	75,90%	24,10%	55361	100%
	Education	1=<SMP	80,70%	19,30%	1796962	100%
		2=High School/MA/equivalent	48,70%	51,30%	1365377	100%
		3=>Diploma 1	37,10%	62,90%	546644	100%
	Work	0=not working	80,50%	19,50%	1399135	100%
		1=Self-Help	61,30%	38,70%	624803	100%
		2=Employees	46,50%	53,50%	1593021	100%
		3=freelancer	75,50%	24,50%	92024	100%
Modes of Transportation	Mode of Transportation used	Not using a vehicle = 0	94,70%	5,30%	734317	100%
		Private Vehicles=1	54,50%	45,40%	2545102	100%
		Public Transportation=2	54,70%	45,30%	429564	100%
	Frequency of mode changes	*Single* Mode=0	55,10%	44,90%	2849654	100%
		Multi Mode=1	87,10%	12,90%	859329	100%

Source: Hasanah, 2025

In Table 2. The percentage of commuters who experience severe congestion against the category of free variables, the first variable discussed is the bound variable (the chance of severe congestion) with the proportion of not experiencing congestion of 62.5% and experiencing congestion of 32.5% with a total commuter population of 3,708,983 people.

The next variable is gender; between the male and female sexes there is a tendency that men experience more congestion than women with a congestion proportion of 42% of the total population of 1,442,951 people.

Another variable of individual characteristics is the age variable. Table 2 shows that out of the 3 existing age ranges, the age range of 15-64 years has the highest proportion compared to the other 2 age ranges with a proportion of 46.40% experiencing congestion. The age range over 65 years has a much lower proportion,

namely 24.10%. The lowest proportion of age is the range under 15 years old which has a proportion of 10.50%. The number of people experiencing the highest congestion is 2,769,715 people.

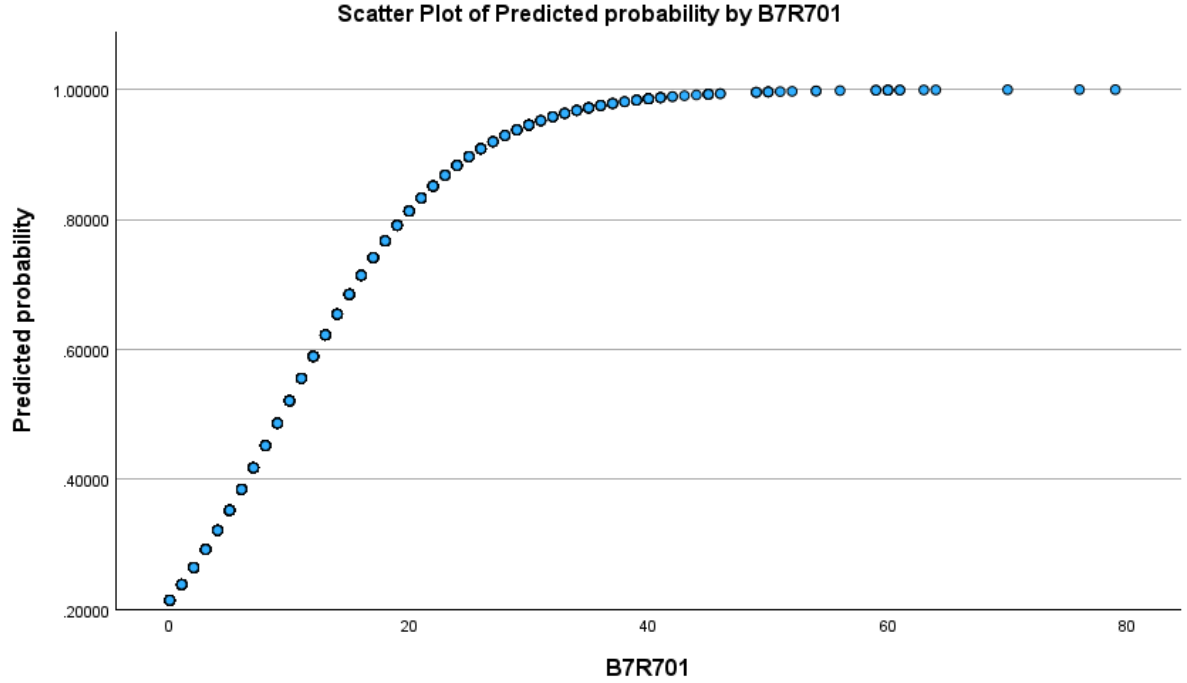
The next individual characteristic variable is the education variable that experiences the highest congestion is education above Diploma 1 graduates, which is a proportion of 62.90% with a total population of 546,644 people. Other education is far below Diploma 1 graduates; high school graduates have a proportion of congestion of 51.30% and the proportion of graduates below junior high school 19.30%.

The type of job that has the highest proportion of congestion is the type of work as an employee with a proportion of 53.50% and an estimated population of 1,593,021 people. Other jobs such as not working, self-employed and freelance workers have a proportion below the type of work as an employee.

The variable mode of transportation that experienced the highest congestion was private vehicle users with a proportion of 45.40% and a population of 2,545,102 people. Private vehicle users are only 0.5% different from public transportation users, which is a proportion of 44.90% of public transportation users who experience congestion. Then the proportion of not using vehicles tends to be very small, namely 5.30%.

The variable of the frequency of change of transportation modes that experienced the highest congestion, namely with a one-time change of mode, had a proportion of 44.90% and the total population was 2,849,654 people. Multi-mode users have a proportion of 12.90%, which is much lower when compared to the frequency of one-mode switching.

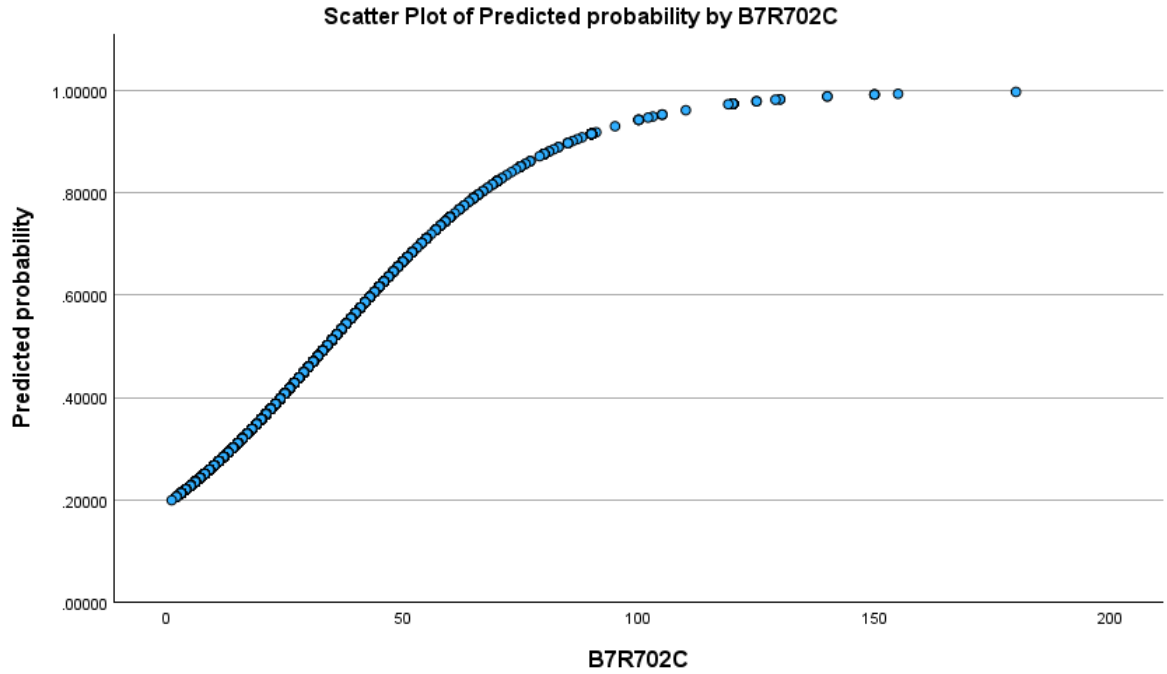
In figure 1 and 2 below, it shows the estimated correlation curve between the predicted probability of experiencing severe congestion in Greater Jakarta, according to the distance traveled from the residence to the main place of activity and the travel time from the residence to the main place of activity. Both graphs show patterns that increase as the duration of the trip increases.



Source: Hasanah 2025

Figure 1. Predict the Probability of Mileage with Congestion

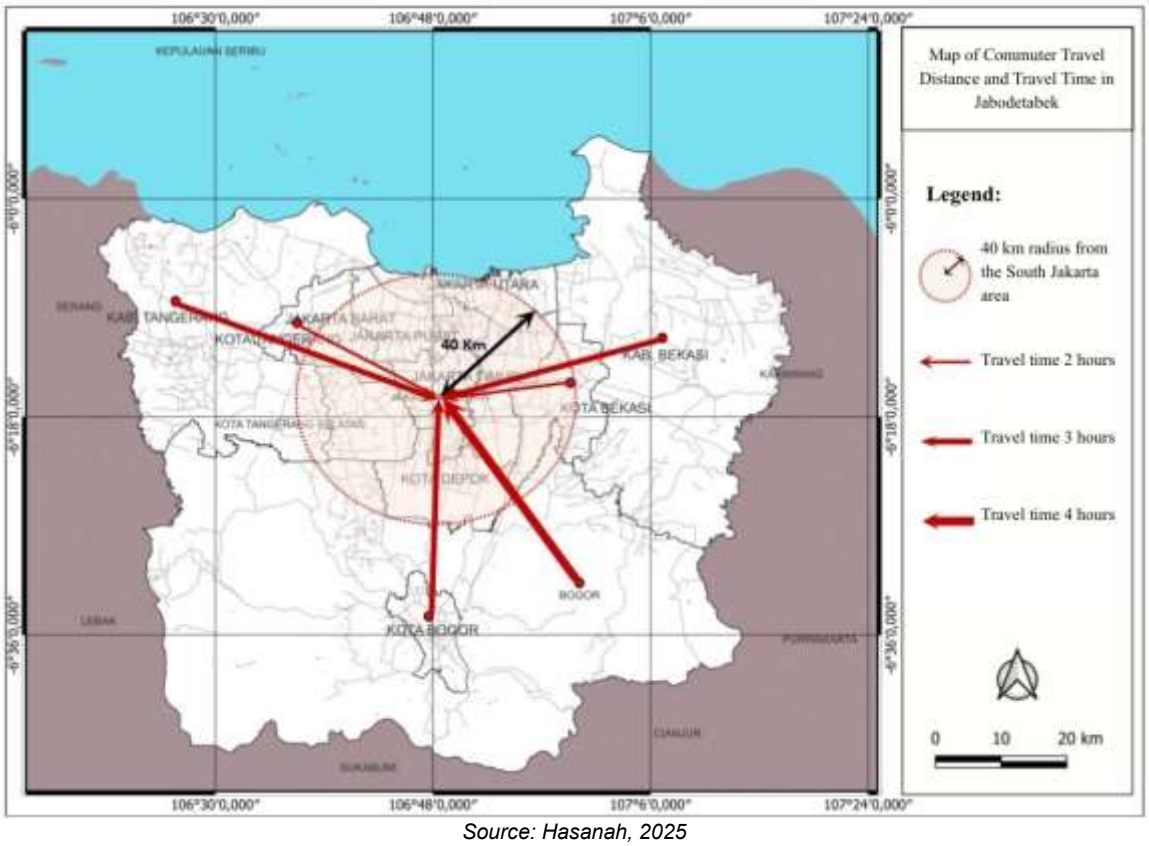
Figure 1 shows a sigmoid curve (S-shape) which estimates the relationship curve between the probability of experiencing congestion based on the distance traveled. When the distance is at zero kilometers, the probability of prediction is still low at about 0.2. But as the distance increases, the probability increases to 1. At more than 40 kilometers, the probability value on the curve is 1 which means that traffic jams begin to occur at 40 kilometers. More than that, commuters experience severe congestion.



Source: Hasanah, 2025
Figure 2. Prediction of Probability of Travel Time with Congestion

Figure 2 shows the relationship between travel time and the prediction of the probability of severe congestion. When the travel time is zero minutes, the probability value of congestion is 0.2, the increased travel time, the probability value of severe congestion increases. The travel time at 150 minutes begins to show a probability value of 1 which means that within 150 minutes severe traffic jams begin to occur.

In figure 1 and 2, it can be explained that with the increase in distance and travel time in line with the increased chance of severe congestion. To map the spatial patterns of severe congestion based on the eighth variable (travel distance) and the ninth variable (travel time), Figure 3 presents the distribution of congestion intensity at the regency/city level across the Jabodetabek metropolitan area.



Source: Hasanah, 2025

Figure 3. Map of Commuter Travel Distance and Travel Time in Jabodetabek

The visualization reveals a strengthening concentration of congestion along corridors oriented toward South Jakarta Administrative City, consistent with its status as the largest commuter destination in 2023 (BPS, 2023). This pattern indicates a meaningful association between the magnitude of inbound commuter flows, longer travel distances/durations, and elevated congestion risk at key activity nodes in South Jakarta. These findings underscore the need for place-based interventions particularly the reinforcement of trunk–feeder integration, improved reliability of public transport on primary ingress–egress corridors, and enhanced last-mile access to reduce severe congestion in South Jakarta and across the broader Jabodetabek region.

Table 3. Statistics of Revenue, Distance Traveled and Travel Time

Independent variables	Categories of Variables	Mean	Median	Mood	Minimum	Maximum	Std	Sum
Revenue (in rupiah)	Not	4.502.582	3.800.000	3.000.000	150.000	100.000.000	4.957.933	2318087
	Yes	6.330.396	4.790.000	3.000.000	200.000	150.000.000	7.181.492	1390896
Mileage (in kilometers)	Not	3	1	1	0	60	6	2318087
	Yes	10	7	1	0	79	10	1390896
Travel time (in minutes)	Not	16	11	6	1	130	15	2318087
	Yes	31	25	30	3	180	25	1390896

Source: Hasanah, 2025

As shown in Table 3, commuters who experience congestion in Greater Jakarta have an average income of 6,330,396 rupiah, with an average distance of 10 kilometers and an average travel time that experiences congestion of 31 minutes. This is in line with the scatter plot graph of travel time which shows congestion starts to occur around 30 minutes from the start of the trip.

b. Inferential Analysis

The results of the inferential analysis are generally in line with the results of the descriptive analysis as described above. The explanation of the results of binary logistic regression analysis is easier to explain by using the ODD (OR) ratio parameter. If OR=1, then there is no difference in the probability of something happening (y=1) in one category of independent variables compared to the comparison category in an independent variable. Therefore, it can be said that there is no effect of these variables on the probability of occurrence y=1.

If OR > 1, the probability y=1 tends to be in a particular category/group compared to the comparison category/group. For example, if OR=2, the probability risk of y=1 tends to occur twice in one group compared to the comparison group. On the other hand, if OR = 0.5, the probability risk of y=1 in one group is 0.5 times compared to the comparison group, or tends to be 2 times more likely to occur in the comparison group.

Table 4. Parameter Estimation (odd ratio) between severe congestion and independent variable

Variables in the Equation

No	Variable	B	S.E.	Wald	Df	Sig.	Odd Ratio
1	JK(1)	.183	.003	4213.874	1	<,001	1.201
	kel_umur (1)			26847.965	2	<,001	
2	kel_umur(2)	.796	.005	25666.237	1	<,001	2.216
	kel_umur(3)	.332	.013	631.905	1	<,001	1.394
3	educ (1)			12773.788	2	<,001	
	educ(2)	.363	.003	10859.332	1	<,001	1.438
	educ(3)	.457	.005	9374.420	1	<,001	1.579
	Stapek (0)			12121.321	3	<,001	
4	Stapek(1)	.526	.005	11385.198	1	<,001	1.692
	stapek(2)	.308	.004	5241.110	1	<,001	1.361
	Stapek(3)	.063	.009	44.438	1	<,001	1.065
5	Income	.000	.000	1795.080	1	<,001	1.000
6	Mode (0)			23863.232	2	<,001	
	Mode (1)	1.497	.010	21684.205	1	<,001	4.466
	Mode (2)	1.400	.009	23291.161	1	<,001	4.054
7	freq_mode(1)	-.715	.008	8095.355	1	<,001	.489
8	distance	.034	.000	8036.350	1	<,001	1.034
9	time	.023	.000	24359.468	1	<,001	1.023
	Constant	-3.678	.011	122541.954	1	<,001	.025

a. Variable(s) entered on step 1: JK, kel_umur, educ, stapek, income, moda, freq_mode, B7R701, B7R702C.

Source: Results of weighting analysis by the Author, 2025

Table 4 shows the results of binomial logistic regression, which shows that all variables have a significant effect on α = 1% on the probability of severe congestion for commuters. The first variable is gender, JK (1) is

the male sex has a significant impact. With or > 1, male commuters tend to experience congestion that is 1,201 times greater than female commuters. This is because men tend to commute compared to men.

The second variable is age group, categorized into three groups: (1) 5–14 years, (2) 15–64 years, and (3) ≥65 years. Among these, the group with a statistically significant association with severe congestion is Group (2), with an odds ratio (OR) of 2.216, indicating the odds of experiencing severe congestion are 2.216 times those of Groups (1) and (3).

The third variable is education, classified into three categories: educ (1) = ≤ junior secondary (≤SMP), educ (2) = senior secondary (SMA/MA or equivalent), and educ (3) = ≥ Diploma I. Relative to lower levels, educ (3) shows an OR of 1.579, meaning individuals with education ≥Diploma I have 1.579 times higher odds of experiencing severe congestion than those in educ (1) and educ (2).

The fourth variable is employment status, categorized as stapek (0) = not working, stapek (1) = self-employed, stapek (2) = employee, and stapek (3) = casual worker. The categories with elevated risk each significant at α = 1% are self-employed (OR = 1.692), employee (OR = 1.361), and casual worker (OR = 1.065), relative to not working.

The fifth variable, income, exerts a positive and statistically significant effect on the likelihood of severe congestion (although the per-unit magnitude is small at the reported scale).

The sixth variable is transport mode, defined as moda (0) = no vehicle used, moda (1) = private vehicle, and moda (2) = public transport. Among these, private vehicle use exhibits the strongest association, with an OR of 4.466 relative to the reference category, indicating substantially higher odds of experiencing severe congestion than both non-users and public-transport users.

The seventh variable is frequency of transfers from home to the main activity location. The coefficient for freq_mode (multi-modal vs. single-mode) yields an OR of 0.489, implying lower odds of severe congestion for trips involving transfers compared with single-mode trips.

The eighth variable, travel distance from residence to the main activity location, shows an OR of 1.034 per kilometer; that is, each additional kilometer increases the odds of severe congestion by 3.4% (significant at α = 1%).

The ninth variable, travel time, shows an OR of 1.023 per minute, each additional minute increases the odds of severe congestion by 2.3% (significant at α = 1%).

Based on the inferential analysis, the estimated model is:

$$g(X) = ln\left(\frac{y=1}{y=0}\right) = \beta_0 + 1.201 * JK\ (male) + 2.216 * kel\ umur\ (15-64) + 1.579 * educ(=> \text{Diploma } 1) + 1.692 * stapek(self\ employed) + 1 * income + 4.466 * moda(private\ vehicle) + 0.489 * freq\ mode(multi\ mode) + 1.034 * distance + 1.023 * time$$

In the descriptive analysis, the percentage of congestion experienced by commuters is explained from the relationship between dependent variables and independent variables. So that an overview of the probability of each independent variable is obtained from the dependent variable. Meanwhile, in inferential analysis, this independent variable is explained by measuring the significance of each independent variable to the dependent variable. So that from each independent variable, it can be known how significant the influence of the independent variable is on the severe congestion experienced by commuters in Greater Jakarta. The closer α = 1%, the more significant the independent variable is in influencing the congestion experienced by commuters in Greater Jakarta.

4. Conclusion

The above analysis description concludes that the probability/risk of congestion can be caused by individual characteristic variables (gender, age, education, occupation, and income), mode of transportation (mode of transportation used and frequency of mode change) and travel characteristics (distance traveled and travel time).

The individual factors that provide a greater probability/risk of experiencing congestion are male gender with an age range of 15-64 years, having an education with graduates above Diploma 1, working as an employee, and having an income of around 6,330,396 rupiah.

The factor of transportation modes that experience congestion is private vehicle modes with a frequency of changing modes once. Meanwhile, the characteristic factor of the trip begins to occur in traffic jams at more than 40 kilometers and a travel time of more than 150 minutes.

Based on the results of this research, the contribution of the academic field to describe commuters who experience congestion in Greater Jakarta is as follows:

The results of this study show that congestion tends to be experienced by formal workers with a higher level of education who have above-average daily mobility from residence to place of activity, so that it can increase traffic density in activity centers. In addition, with a relatively high level of income, commuters prefer to use private vehicles by providing convenience not to change modes of transportation to support daily activities. This results in traffic density that cannot be avoided, so that severe congestion is experienced by commuters in Greater Jakarta, both private vehicle users and public transportation. The congestion occurred at more than 40 kilometers and a travel time of more than 150 minutes. This condition shows that the farther the distance travels, the more it passes through points prone to congestion, and the longer the travel time, the more inefficient the movement of vehicles, the higher the potential for individuals to experience severe congestion.

The findings are expected to inform policy by encouraging the Government to increase public transport use through simplified integrated fares and timetable coordination, thereby improving the comfort and

convenience of intermodal transfers for commuters. Additional recommendations include promoting transit-proximate housing near transport hubs and major employment centers to shorten daily travel distances, and incentivizing flexible work hours or remote work arrangements to diffuse peak-period demand. Taken together, these measures can help alleviate severe congestion experienced by commuters in Jabodetabek. Accordingly, policy strategies should prioritize service integration including timetable synchronization, consolidation of trunk–feeder networks, bus priority lanes, park-and-ride facilities, and integrated fares in parallel with selective enhancements to physical road capacity. The findings are expected to inform transport planning in the region particularly policies to increase public transport uptake and to strengthen intermodal integration and connectivity to mitigate the current levels of severe congestion.

Acknowledgement

The editorial team extends its deepest gratitude to all participants, contributors, and related parties who have provided valuable support, ideas, and contributions to the publication of this journal. We hope that the collaboration that has been established will continue to grow in support of the advancement of science and scholarly publishing.

References

Apriyono, T., & Paskalis, D. (2021). Analisis Faktor-Faktor yang Mengakibatkan Kemacetan Lalu Lintas Pada Ruas Jalan Budi Utomo dan Jalan Hasannudin di Kota Timika. *Jurnal Kritis*.

BPS. (2023). *Hasil Survei Komuter Jabodetabek.* Badan Pusat Statistik.

BPS. (2023). *Statistik Komuter Jabodetabek.*

Buchoud, M. R. (2020). *A Handbook on Sustainable Urban Mobility and Spatial Planning: Promoting Ative Mobility.* Geneva: United National.

Direktorat Jenderal Bina Marga, D. B. (1997). *Manual Kapasitas Jalan Indonesia.*

Firman, T. (1996). Pola Urbanisasi di Indonesia: Kajian Data Sensus Penduduk 1980 dan 1990.

Haryono, Darunanto, D., & Wahyuni, E. (2018). Persepsi Masyarakat Tentang Kemacetan Lalu Lintas di Jakarta. *Jurnal Manajemen Transportasi & Logistik*.

index, t. t. (2024). Retrieved from tomtom.com: https://www.tomtom.com/traffic-index/ranking/?country=ID

Mantra, I. (1989). *Mobilitas Penduduk Sirkuler dari Desa ke Kota di Indonesia.* Yogyakarta.

Mu'allimah. (2021). Analisis Kebijakan Pemerintah Provinsi DKI Jakarta Dalam Mengatasi Permasalahan Transportasi Di Perkotaan. *Jurnal Manajemen dan Ilmu Administrasi Publik*.

Prianto, H., Fahmi, J., & Permatasari, C. (2020). Preferensi Masyarakat Terhadap Transportasi Publik Di Kota Banda Aceh. *Jurnal Ekombis*.

Renkow. (2003). Employment Growth, Worker Mobility and Rural Economic Development. *American Jorunal of Agricultural Economics*.

Rozari, A. d., & Hari, Y. (2015). Faktor-Faktor yang Menyebabkan Kemactean Lalu Lintas di Jalan Utama Kota Surabaya. *Jurnal Penelitian Administrasi Publik*.

Saefullah. (1996). Mobilitas Internal Non-Permanen.

Sitanggang, R., & Saribanon, E. (2018). Faktor-Faktor Penyebab Kemacetan di DKI Jakarta. *Jurnal Manajemen Bisnis Transportasi & Logistik*.

Tamin, O. (2000). *Perencanaan dan Pemodelan Transportasi.* Bandung: ITB.

Wahyu, D., & Ernawati, J. (2013). Pemilihan Moda Transportasi ke Kampus oleh Mahasiswa Universitas Brawijaya. *Indonesian Green Technology Journal*.

Warsida, R. Y., Adioetomo, S. M., & Pardede, E. L. (2013). Pengaruh Variabel Sosio-Demografis terhadap Mobilitas Ulang-Alik di Jabodetabek. *Jurnal Ekonomi dan Pembangunan Indonesia*.